

county. Other national MCH health objectives that could be used in this way include objectives to reduce infant and maternal mortality rates (1). Because of the small number of births occurring in Umatilla County, even during a 14-year period, the significance of these measures would be difficult to interpret. Still other national health objectives could be used for AI communities, although comparable data for the non-AI population may not be readily available. As an example, the IHS is establishing surveillance systems to estimate the proportion of AI women who smoke or use alcohol during pregnancy. The surveillance will allow local AI communities to set and measure public health objectives designed to protect fetuses, as well as mothers. IHS area offices will be able to monitor progress on these objectives in several local AI communities and evaluate the efficacy of public health intervention efforts to achieve the objectives.

We conclude that (a) vital record data can be used to assess changing health patterns in small areas for both minority and majority populations,

(b) additional risk data should be collected and used to focus preventive health care programs in local areas, and (c) vital record and behavioral risk data together can be used to monitor achievement of public health objectives. The IHS, in collaboration with State health departments, plans to pursue this strategy in the 1990s.

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Preventing Baby Bottle Tooth Decay in American Indian and Alaska Native Communities: A Model for Planning

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Synopsis.....

Baby bottle tooth decay (BBTD) is a preventable dental disease which surveys have shown affects more than 50 percent of Native American children. An experimental program to prevent BBTD was implemented in 12 Native American communities. The project represented a cooperative effort by three Department of Health and Human Service agencies: Administration for Children, Youth, and Families, Head Start Bureau; Indian Health Service, Dental Program; and Centers for Disease Control, Dental Disease Prevention Activity.

Intervention strategies included the training of parent volunteers, health professionals, and the tribal employees who counseled caretakers of young children and made group presentations. There was also a media campaign in each community that ran for a 3-year period. Numerous educational materials were developed including training manuals, counseling booklets, tippee cups, posters, and bumper stickers. The BBTD project's planners encouraged tailoring the education materials and

strategies to fit each community. Preliminary results documented statistically significant decreases in the prevalence of BBTD at the pilot sites. This

multidisciplinary, comprehensive intervention offers a model for organizing members of minority communities to prevent health problems.

PREVENTING BABY BOTTLE tooth decay (BBTD) is the goal of several imaginative campaigns underway in Native American communities. The BBTD project is an experiment, and it offers a model for designing interventions in minority communities. The purpose of this paper is to describe the interventions aimed at the prevention of baby bottle tooth decay (BBTD) in Native American communities. It is a cooperative effort of three agencies of the Department of Health and Human Services: Administration for Children, Youth, and Families, Head Start Bureau; Indian Health Service, Dental Program; and Centers for Disease Control, Dental Disease Prevention Activity. Development of the program began in 1984, and it was implemented at the first four sites in 1985. In 1986, eight more sites were added. Assessment will continue until 1990, and it is anticipated that the project will continue indefinitely. The design and implementation of the intervention are described in this paper, and preliminary evaluation results are reported. The authors wrote the original grant proposal for the BBTD project and served on the core planning group.

Background

Baby bottle tooth decay is dental disease that is often severe in the primary dentition. It is characterized by a unique pattern of decay beginning with the maxillary primary incisors followed by the primary molars, in order of eruption (1-10). Long-term ramifications of BBTD may include otitis media, orthodontic problems, speech disorder, and possible psychosocial concerns (10).

Baby bottle tooth decay is the result of one or both of the following behaviors: leaving a bottle with a child at nap or bedtime and permitting a child to walk around or sit with a bottle during waking hours (1,10). Any liquid with fermentable sugar can cause BBTD. These liquids include formula, milk, juice, and pop (1,11). Inappropriate breast feeding, usually the result of a mother and infant sleeping together with the child nursing at will throughout the night, has also been reported to cause BBTD in rare instances (12).

In 1983-84, an Indian Health Service (IHS) survey of 1,321 children 0-4 years old documented

that approximately 52 percent of the children had BBTD (13). In 1985, a survey of 514 Native American children in Oklahoma and Alaska reported 53 percent prevalence of BBTD with a range of 17 to 85 percent in the 18 communities surveyed (14). In a survey of 1,607 Cherokee and Navajo Head Start students (15), 70 percent of the children were affected by BBTD, and 87 percent of those affected displayed the most severe manifestation of the disease. "Severe" was defined as two or more maxillary anterior tooth surfaces with caries, plus one or more teeth with pulpal involvement or mandibular anterior decay, or both. Head Start and IHS cost estimates, based on children treated under contract by pediatric dentists in private practice, are \$700 to \$1,200 for a moderate to severe case of BBTD. If hospitalization is necessary, the cost is approximately doubled.

Program Design and Description

Head Start dental consultants gathered preliminary data on the prevalence of BBTD in Native American communities. The authors outlined an intervention and submitted a grant proposal in 1984 to the Head Start Bureau for funding. When the grant was awarded to the IHS dental program, a core group of 12 experts in children's health, dental disease, nutrition, health education, and research was formed to design the intervention and an evaluation of its effects. The core group also provided technical consultation and continuity to the project sites throughout the implementation and evaluation stages of the project.

The question to be answered by the evaluation was whether a community-based health education intervention could effectively reduce the prevalence of BBTD among Native American children. At the onset, the measurable goal established was to reduce the number of children with BBTD by 50 percent in a 5-year period.

The target population of this program was actually the caretakers of young children, since only by their actions can BBTD be prevented. Through the 12 Indian Head Start programs that are the grantees, the BBTD project serves more than 4,700 children and their families. In addition, the project has expanded to the majority of the remaining 93

Indian Head Start grantees to include more than 14,000 Head Start children and their families.

There were initially four pilot sites: Cherokee Nation, OK; Rosebud Sioux, SD; Leupp (Navajo), AZ; and Tlingit-Haida, AK. These were labeled "high intensity" sites because the site coordinators and parent volunteers were trained directly by professionals of the project development team who visited each site during the first year of the project. In 1986, it was decided to test the intervention at different intensity levels. Four "medium intensity" sites—Isleta Pueblo, NM, Northern Cheyenne, MT, White Mountain Apache, AZ, and Yakima Nation, WA—were selected. Four "low intensity" sites included Oglala Sioux, SD; Pauma Valley, CA; San Carlos, AZ; and Eastern Band of Cherokee Indians, NC. At the medium intensity sites, the site coordinators received training from the project development team at a central location, while the site coordinators from the low intensity sites received no training; they were given only the educational materials developed for the project.

The program was designed to be a multidisciplinary, community-based intervention. It closely followed the PRECEDE model for planning health education programs (16). The steps in the PRECEDE model include a social diagnosis, epidemiologic diagnosis, behavioral diagnosis, educational diagnosis, selection of educational strategies, administrative diagnosis, and evaluation.

The epidemiologic diagnosis resulted in the documentation of BBTB prevalence rates ranging from 40–84 percent at the 12 pilot sites. These data were presented to community leaders to demonstrate that a problem existed at each site. A nationwide health initiative would have seemed impersonal to the people in these rural communities without proof that the problem existed among their own children.

Once it was affirmed that a serious health problem existed, informal surveys and information gathering assisted in making a behavioral diagnosis. Further, the trainers who visited the high intensity sites engaged parents in discussions about the values, attitudes, and behaviors surrounding prolonged bottle feeding in Native American communities. The information that they gained was relayed to the core group who used this feedback to direct the design of the interventions. Among the causes of BBTB in Native American communities were caretakers permitting prolonged use of the baby bottle past 1 year of age, routinely giving bottles to a child during sleeping hours, and frequently giving bottles to toddlers to sip on over

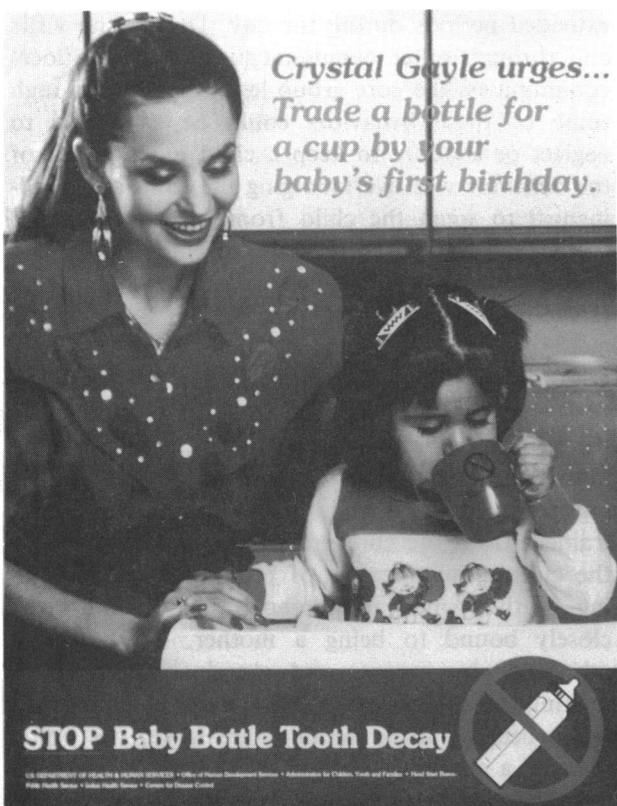
extended periods during the day. During site visits and through other communications with the local communities, the core group learned that, although some of these behaviors could be attributed to neglect or a desire to keep a child quiet, much of the behavior was overindulging the child or unwillingness to wean the child from a beloved bottle. Apparently, a large percentage of Native American women breastfeed their infants but later wean them to the bottle instead of a cup.

The educational diagnosis was complex; the core group attempted to determine the factors leading to the behaviors that cause BBTB. The program that the group designed was aimed at impacting the knowledge, attitudes, beliefs, and values of the caretakers of young children. During site visits, the trainers from the core group began to understand the cultural significance of prolonged bottle feeding. Native American women's identities are often closely bound to being a mother. There was a reluctance by parents and grandparents alike to making the child give up this symbol of babyhood. Also, because many families are large, the bottle may be a surrogate babysitter when the mother is overwhelmed by daily responsibilities. Other necessary enabling factors were to teach caretakers parenting skills, emphasizing the need to say "no" when it was for the good of the child's health. To overcome resistance to saying "no" to children, analogous situations were identified, such as not letting them play in the street or play with matches.

Prolonged bottle feeding and children with decayed front teeth were so common and socially acceptable in the pilot communities that there was no peer pressure or community norm to encourage weaning children from the bottle. The entire community had to be involved so that eventually the behaviors leading to BBTB would become socially unacceptable.

The selection of the educational strategies involved linking the diagnostic criteria with methods of education. In these Indian communities, this choice was also directed by a concern for the cultural appropriateness of each strategy.

Two approaches were chosen as interventions. The first was a one-to-one approach; parent volunteers, health professionals, and tribal employees talked to parents both individually and through group meetings. Each site coordinator recruited 15 or more parents and tribal employees from health related programs to be trained in BBTB prevention. The training was provided by a team of two core group members, with experience in adult education, and the local site coordinator. The



The media campaign against BBTB used posters, public service announcements, and newspaper articles. Messages were changed quarterly and the campaign continued for 3 years.

training consisted of 32 hours of instruction for 15 or more people. The 4-day training provided technical information about the consequences and prevention of BBTB. Discussions and role-playing designed to improve communication skills were part of the training. A counseling booklet was given to each trainee; "Parents Helping Parents" is a captioned picture story about BBTB and how to prevent it. The trainees were encouraged to individualize the information for their communities by using prevalence data for their site and telling anecdotes from their own experiences.

The trainees were also taught how to make group presentations and organize social gatherings called "swap parties" to encourage parents to "swap" their child's bottle for a cup by 1 year of age. A slide presentation was developed from the "Parents Helping Parents" booklet to use during group presentations. Parents who attended the community meetings were given a two-handled training cup imprinted with a "Stop BBTB" logo. Participants were also given "Stop BBTB" bumper stickers and BBTB coupons to give to friends and relatives who might want to trade their children's bottles for cups at local "swap shops."

In addition to the initial training, staff at each site conducted training sessions for other health professionals and tribal employees in order to raise awareness about the BBTB project and to encourage these professionals and para-professionals to take part in the intervention. As a result, physicians, nurses, nutritionists, Foster Grandparent groups, Community Health Representative programs (tribal health employees), health educators, and WIC (Women, Infant, and Children supplemental food program) staff became involved in counseling and group presentations. Some IHS and tribal employees also joined parent volunteers and the site coordinator to develop a task force at each site. The role of the task force was to organize the implementation of the intervention, organize data collection, identify local funding sources, order educational materials, and organize the media campaign. Thus, the BBTB program became integrated into each community using varying sets of "players." It was deemed important that the project be directed by the individual communities according to their specific health system and social structure.

The second major approach consisted of a media campaign designed to raise awareness and knowledge about BBTB community-wide. Its intent was to make prolonged bottle feeding less socially acceptable in Native American communities. A series of posters, public service announcements, and newspaper articles were released quarterly over a 3-year period. The messages changed with each release, and the target population varied to include parents, grandparents, siblings, and other caretakers of young children. The planning group was especially proud of recruiting the famous Cherokee Indian country and western singer, Crystal Gayle, to be photographed for three BBTB posters.

Two training manuals were designed. One outlined the steps in organizing a BBTB intervention in Native American communities. It included forms for obtaining tribal permission and support for the project, forms for recording the prevalence of BBTB, and an inventory of organizational tasks and responsibilities to ensure both health professional and lay community involvement. The second manual included the necessary information to conduct training of volunteers in the community.

A knowledge and attitude survey was administered to the caretakers of young children—parents, grandparents, older siblings, and tribal employees—at the four high intensity sites. This survey will be readministered during 1990, the final year of the project, to monitor changes in knowledge and attitudes. It may have served as an intervention

in itself by raising the salience of BBTD with those surveyed. The health professionals who administered the surveys seized the "teachable moment" as they reviewed the questionnaire answers with individual respondents. The central planning group used information gleaned from analyses of the survey results to direct future interventions and to design subsequent educational materials. The behavioral and educational diagnoses, in effect, were ongoing processes.

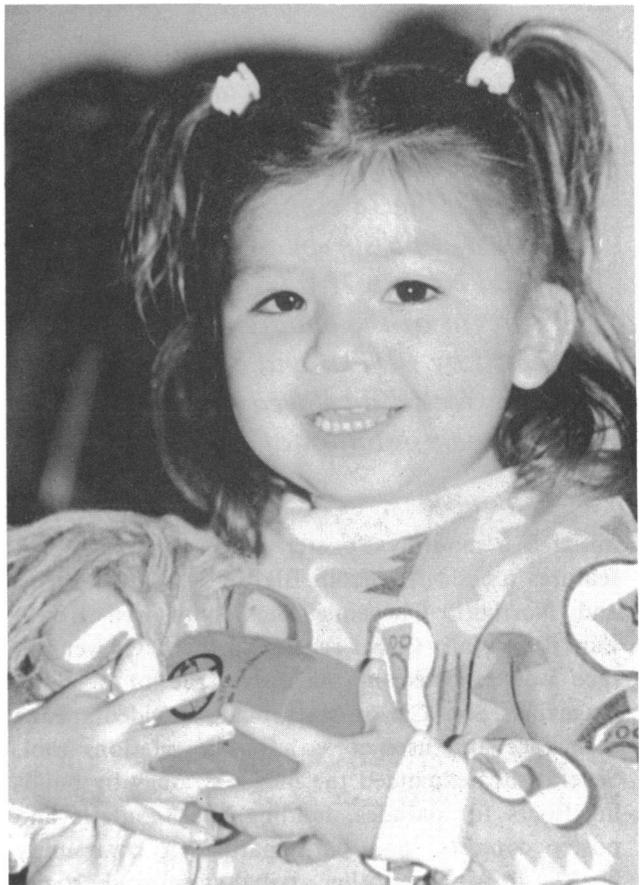
In addition to the core group's strategies, people at the BBTD pilot sites came up with several strategies as they became more involved in the project. For example, the Rosebud Sioux WIC Program designed a picture holder printed with the BBTD logo. The WIC staff photographs infants soon after birth and again in 1 year. Parents who have weaned their babies to a cup by 1 year are given the photos in the BBTD holder. Pictures are treasured in this Indian community, and they have served as both an incentive and reward for practicing a positive health behavior.

The Tlingit-Haida staff developed a computer list so that mailings can be sent to parents of a 1-year-old to remind them to wean their child to a cup. The staff also put together packets containing a balloon, toothbrush kit, and pamphlets on BBTD that have been distributed at health fairs, by mail, and during home visits. Yakima Nation organized a mailing of "Happy Birthday" letters to 1-year-olds. Isleta Pueblo and Oglala Sioux organized mailings to the parents of all newborns. Those mailings included a coupon for the BBTD tippee cup.

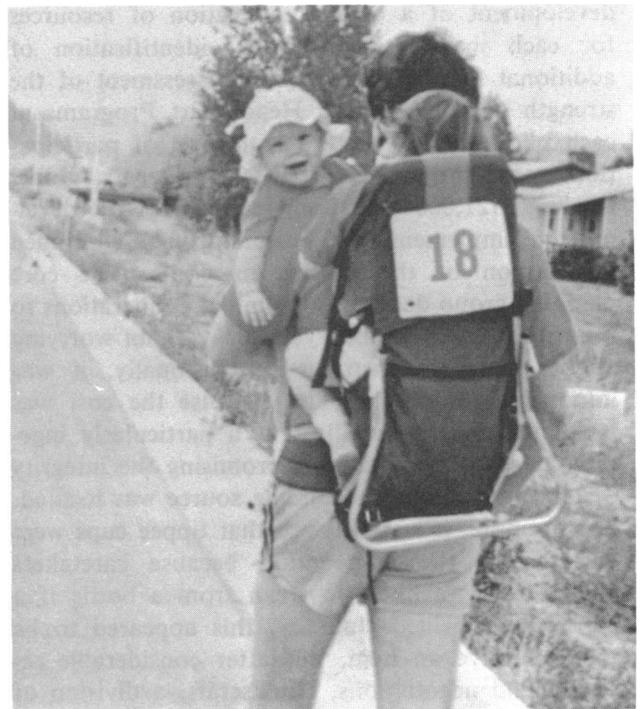
Leupp volunteers sponsored baby contests, designed billboards and posters, and produced a 10-minute videotape that features BBTD task force members and Navajo children to personalize the problem to the reservation. The volunteers also distributed pacifiers, a somewhat controversial practice, that the project's leaders left to the discretion of the individual communities.

Cherokee Nation, OK, aggressively promoted the prevention of BBTD by using the media. Two television shows, radio spots, and articles in not only tribal publications but also in surrounding city newspapers carried the prevention messages. The task force members also initiated the revision of the "Parents Helping Parents" booklet which they produced and marketed.

At Northern Cheyenne, health center staff wear BBTD T-shirts each Wednesday, and a bulletin board in the lobby of the health center was created from "Parents Helping Parents." This site has also



Persuading parents to exchange the child's bottle for a tippee cup at 12 months was part of the Stop Baby Bottle Tooth Decay campaign.



Fun/Run/Walk/Crawl races were among the events used to promote the campaign to prevent tooth decay among Native American children.

'In 1985, a survey of 514 Native American children in Oklahoma and Alaska reported 53 percent prevalence of BBTB with a range of 17 to 85 percent in the 18 communities surveyed. In a survey of 1,607 Cherokee and Navajo Head Start students, 70 percent of the children were affected by BBTB, and 87 percent of those affected displayed the most severe manifestation of the disease.'

initiated a monthly "poster child" campaign that features a child free from BBTB. Both San Carlos and Northern Cheyenne sites sponsored BBTB Fun/Run/Walk/Crawl races. Northern Cheyenne's race was reported in the July issue of Walking magazine. San Carlos staff made a videotape of their race and used it as a public relations tool. Several sites expanded the media strategy by building floats for parades, holding baby contests and poster contests, and participating in community health fairs and other tribal-sponsored social events.

Finally, the administrative diagnosis included the development of a budget, allocation of resources for each intervention strategy, identification of additional funding sources, and assessment of the strength of the IHS and Head Start Programs at each pilot site to ensure a high level of participation in the project. Over the past 4 years, grants totaling \$121,000 have been received for the development, implementation, evaluation, and continued distribution of the project materials. The core planning group decided in its initial deliberations to brainstorm ideas for interventions without worrying about financial constraints. Occasionally, it was impossible to fund an idea because the cost was prohibitive but, generally, for a particularly ingenious idea, rather than compromising the integrity of the interventions, a funding source was located. For example, it was believed that tippee cups were essential to the intervention because caretakers would be more likely to wean from a bottle if a cup were provided. Initially, this appeared to be too expensive an item, but after considerable research and negotiations, Hankschaft, a division of Gerber, agreed to produce the cups imprinted with the BBTB logo. Hankschaft has donated thousands

of cups, and the rest have been sold to the project for cost.

The essential ingredient of the program was the contribution of in-kind and volunteer services. Each site assigned either an Indian Health Service or tribal employee to coordinate the BBTB project, and these people added this responsibility to their full-time jobs. At each site, the IHS dental staff contributed extensively to the implementation and evaluation stages, and various other health professionals and tribal employees incorporated BBTB "duties" into their schedules. Task force members often donated time outside their paid work hours. It has become impossible to track accurately the hours that this ever expanding group of people have contributed. As the programs became integrated into the communities, people who had never formally been attached to this effort started spreading the word about BBTB and its prevention.

Evaluation Design and Preliminary Findings

The evaluation plan was designed in conjunction with the intervention, but it was refined during the second year of the intervention and expanded to include additional process evaluation. The American Public Health Association advocates the use of five concepts essential in planning evaluations of public health interventions (17). It thus seems appropriate to discuss this project briefly in the context of these concepts: (a) appropriateness, (b) adequacy, (c) effectiveness, (d) efficiency, and (e) side effects.

The BBTB program was appropriate from both the consumers' and providers' perspective because this preventable condition was extremely prevalent among the IHS population. IHS resources have been overburdened with treating BBTB, and the children and their families have suffered both physical and emotional pain as a result of the disease. Therefore, parents and community leaders acknowledged the appropriateness of the project after they became informed about the magnitude of the problem in the community.

Defining adequacy of an intervention required that the planning group establish an "adequacy" benchmark. Reducing the prevalence of BBTB at project sites by 50 percent in 5 years was selected as a challenging objective that was potentially achievable with the available resources. Such a reduction would have significant positive impact on dental treatment resources. Furthermore, a reduction of this magnitude could potentially result in sufficient social change in the respective communi-

ties such that a modeling effect would help sustain continued reduction in BBTB prevalence.

Effectiveness required measuring the impact of activities on attaining the specified objectives. It was decided that dental screenings would be conducted at the local Head Start centers each year to track the prevalence of BBTB. The progression of BBTB is such that no change was expected until at least the third year of the project. Thereafter, BBTB would continue to decrease significantly each year if the program was successful.

Preliminary data document an overall decrease in BBTB prevalence from 57 to 43 percent at 12 sites, resulting in a 25 percent reduction ($P < .001$) with 1 year remaining in the project (see table). At the high intensity sites, BBTB has decreased from 53 to 35 percent, resulting in a 33 percent reduction ($P < .001$).

The prevalence of BBTB decreased at all sites except Tlingit-Haida, Pauma Valley, and Isleta Pueblo. Tlingit-Haida experienced a 20 percent increase in BBTB, but the numbers at this site are extremely small, and the 1989 sample was smaller than the 1986 sample. Pauma Valley and Isleta Pueblo have dropped out of the BBTB project. Enthusiasm waned, key personnel were transferred, and the program administrators did not obtain prevalence data in 1989. Therefore, to include the effect of the failure at these two sites, it is assumed that BBTB prevalence has remained the same. These two sites, however, will be surveyed during the final year of the project. The yearly IHS Dental Services Data Report, which records dental treatment provided to IHS eligible patients nationwide, will be used as concurrent validation for the findings of the Head Start surveys. The yearly report offers information about the sites that did not participate in the intervention.

The strength of the intervention is tracked by quarterly site reports and monitoring the distribution of educational materials. In 1987, more than 250 requests for educational materials were filled and, in 1988, more than 340 requests were filled. Requests have come from international and national health agencies. Many State, county, and local health departments have adopted the materials and the slide presentation has been translated into five languages. More than 1,500 copies of "Parents Helping Parents," approximately 100,000 cups and bumper stickers, and 63,000 posters have been distributed. Demand far exceeds the supply of educational materials.

Assessing efficiency, or the cost of the observed effects, offers one of the more difficult challenges

Reduction in prevalence of baby bottle tooth decay (BBTD) by level of intervention

Intensity	Number screened	BBTD		Percent reduction	P value
		Number	Percent		
High (4 sites):					
1985	384	204	53
1989	383	133	35	33	<.001
Medium (4 sites):					
1986	544	353	65
1989	549	292	53	18	<.001
Low (4 sites):					
1986	455	238	52
1989	640	245	38	27	<.001
All sites:					
Baseline	1,383	795	57
1989	1,572	670	43	25	<.001

of evaluation. The direct funding was easily assessed, but the volunteer hours and in-kind contributions were difficult to track and assign dollar values. Nonetheless, efficiency will be assessed by estimating the cost of BBTB treatment, calculating savings in the cost of treatment averted by the decline in the prevalence of BBTB, and comparing these savings to expended project funds and estimated in-kind services.

If one assumes a conservative cost estimate and an average reduction of 25 percent in BBTB cases at the 12 sites, then BBTB was prevented in 302 children whose treatment would have cost \$211,400. This estimate excludes expenses for general anesthesia or hospitalization. By the final year of the project, an entirely new cohort of children will be surveyed, and it is expected that the savings will eventually be multiplied many times over. No attempt was made to estimate the cost benefit in terms of emotional trauma and pain avoided, decreases in ear and speech problems, or the long-term savings in orthodontic treatment since it is nearly impossible to quantify these savings.

The assessment of side effects required documenting both desirable and undesirable outcomes other than the intended purpose of the project. The planning group anticipated positive side effects related to developing health networks in the pilot communities, but there have been unanticipated side effects as well. Side effects were tracked through quarterly reports from each pilot site and other communications between the pilot sites and the project administrators.

Two negative side effects have thus far been identified. The first is a potentially unhealthy competitiveness across project sites relative to who

'The essential ingredient of the program was the contribution of in-kind and volunteer services. Each site assigned either an Indian Health Service or tribal employee to coordinate the BBTB project, and these people added this responsibility to their full-time jobs.'

is "the best." At times, the sites have appeared to be in a race to see who can attain the lowest levels of BBTB. Fortunately, implementation of the project required equal dissemination of educational materials and ongoing communication among sites to share creative ideas. The second negative side effect was that some of the medium and low intensity sites deviated from the research protocol by implementing the project at a higher level than they had originally agreed to. As the lower intensity sites raised community and health professional awareness about BBTB, some became impatient to "do more" about the problem and thus contaminated the evaluation design.

A two-edged side effect is the level of ownership that the pilot sites have assumed for the BBTB project. The ownership has been positive in that the communities now accept responsibility for preventing BBTB. Assumption of responsibility inspired the creation of additional strategies and led to an individualized program at each pilot site. On the Navajo reservation, the tribe supported the expansion of the BBTB pilot site to the entire reservation, and it now reaches 3,298 children through 30 Head Start centers with a staff of 300 volunteers. On the negative side, however, individualization has clouded distinctions between different intensities of implementation. Also, the level of ownership has become so intense that at some sites there has been resistance to outside interference or requests for process and outcome data from the national program coordinators.

A most significant positive side effect has been the cooperative networks that have been developed across the communities and organizations (for example, schools, WIC, Head Start, IHS, and so forth). BBTB has been addressed in the Year 2000 Health Objectives for the Nation. Changes within the IHS system are another effect. For example, health administrators in many IHS clinics have had prevention of BBTB added to their performance standards. Furthermore, similar cooperative efforts

to prevent other health problems, for example, periodontal disease and use of smokeless tobacco, are modeling the BBTB project. The increased credibility and visibility of the dental programs in the community appears to be contributing to greater community support for water fluoridation and policies limiting the sale of tobacco products. Finally, and possibly the most significant effect, is that the success of the BBTB project may empower members of the community to address other critical public health and social problems.

An unexpected side effect has been the special awards earned by the BBTB project. The project received the 1988 American Dental Association's "Community Preventive Dentistry Meritorious Award." Dr. Jeff Mabry, a core group member, received the 1988 American Academy of Pediatric Dentistry's "Public Awareness Award" for his role in developing the BBTB project. Crystal Gayle received the 1988 American Association of Public Health Dentistry's "Presidential Award" for her efforts to improve the oral health of children through the BBTB project. The Rosebud WIC program received the national WIC "Focus on Management Award" for creating the photo folders for the BBTB project. Most recently, the BBTB core group received the Department of Health and Human Service's, U.S. Public Health Service "Outstanding Unit Citation" for their efforts on the BBTB project.

Discussion

There are several lessons to be learned from the BBTB project. First, it appears important to follow the theoretical planning models documented in the health education literature. Each step of the PRECEDE model for planning was closely followed in the BBTB project with the exception of the "social diagnosis." According to the PRECEDE model, the health problems of a community should be viewed in light of its social problems. Those who work in health agencies that serve minorities rarely have the resources or political power to address the bigger societal problems of economics, racism, education, and so forth that are closely related to health problems. According to the model, the health concerns should then be prioritized for the allocation of limited health education resources. Unfortunately, IHS is organized in a way that often results in a compartmentalized approach to health planning. The BBTB project did, however, develop a network of several disciplines actively participating in the intervention. This network

assisted in creating the critical mass of community awareness necessary for behavior change.

The epidemiologic diagnosis was a critical step not only for planning but for rallying community support. It was essential that health status data be specific to the community. National data are too obscure and impersonal to generate enthusiasm and ownership in local communities. The BBTD program demonstrated that once a community became aware of a specific health concern and educational materials were made available, the project gained momentum.

The behavioral and educational diagnoses were important steps in the planning process. It would be presumptuous, particularly in minority communities, for health professionals and administrators to assume that they understand all the beliefs, attitudes, and behaviors underlying a particular health problem. Therefore, knowledge and attitude surveys, focus groups, and community representation on task force groups were essential. Also, the BBTD project, as an ongoing experimental enterprise, allowed changes and additions to the original package of interventions as feedback from the communities directed these modifications. Although this flexibility favors a heuristic and at times muddled research design, it resulted in tailored and evolving interventions at each pilot site.

The core planning group was paramount in the success of the BBTD project. This group was funded for central planning sessions and was given freedom to design the educational strategies. The key ingredients to supporting the planning group were the provision of an identity, adequate time, and adequate resources. A combination of structure and flexibility resulted in a level of creativity often stifled in other settings.

The quasi-experimental research design used a nonequivalent control group (18). This design should control many of the threats to internal validity including history, maturation, testing, instrumentation, selection, and attrition. Since the sites were chosen nonrandomly, external validity may be limited to similar Native American communities. We have anecdotal reports that the program has been implemented successfully in other minority communities where BBTD is a health concern.

The decrease in BBTD prevalence appears to be related, at least in part, to the level of intensity at the pilot site. The high intensity sites realized the greatest reduction in disease, but the designated low intensity sites experienced a greater reduction in BBTD than the medium intensity sites. Oglala Sioux and Cherokee low intensity sites both solic-

ited additional support from outside sources in the form of training and funding. This support was given despite the reluctance of the core group to agree to this change. The additional training and funding may explain the large decrease in percentages of affected children at these sites where the level of support was similar to that of the higher intensity sites. The enthusiasm at the pilot sites further contaminated the research design but intensified the level of intervention at Oglala and Cherokee.

The true reduction of BBTD in the pilot communities may never be known because the program's effects were measured only in Head Start children. The project was implemented community-wide, and it may have had a positive effect on all children in the community, not just those who attended Head Start. This sampling limitation probably underestimates program effects.

In summary, although the program has thus far reduced prevalence of BBTD by 25 percent, participation in the BBTD project may prove to be more powerful than the reduction of disease. The pilot sites have successfully organized themselves for community action. Health promotion-disease prevention programs should favor models of intervention that encourage community organization because the skills learned may further empower minority communities to organize and create their own interventions to achieve social change.

Conclusions

1. The BBTD prevention project has achieved statistically significant decreases in BBTD, and thus it offers a potentially effective model for other health interventions in minority communities.

2. A key element of the project was the establishment of a core group of planners representing many disciplines. This work group was given an identity, adequate time, adequate resources, and a balance of flexibility and structure to encourage creativity in designing the experimental project.

3. A theoretical model for planning health education interventions was followed. Consistent with this model, each community was allowed the flexibility and provided resources to "customize" the program in accord with its individual social structure, health system, and cultural beliefs.

4. The evaluation plan included not only process and outcome indicators of effectiveness but also the tracking of negative and positive side effects. The positive side effects may eventually prove to be the most powerful results of the intervention.

5. The BBTD program appears to have mobilized communities whose members have learned how to organize themselves for positive change.

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Participation Rates, Weight Loss, and Blood Pressure Changes Among Obese Women in a Nutrition-Exercise Program

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Synopsis.....

Since 1985, a black urban community in Atlanta has planned, implemented, and evaluated a cardiovascular risk reduction project. The Community Health Assessment and Promotion Project (CHAPP) was developed to reduce the high incidence of cardiovascular risk factors in the neighborhood's predominantly black population. Based on data from a needs assessment, a community coalition designed and directed a 10-week exercise and nutrition intervention targeted to obese residents between the ages of 18 and 59 years. The intervention consists of an orientation, attitudes assessment, selection of a specific exercise class, and twice-weekly information on nutrition and community resources.

The program uses a wide range of strategies, including individual consultations, reminder telephone calls, incentives, and rewards, and free transportation and child care, to encourage participation. The exercise-nutrition intervention was provided to two separate groups. A total of 70 participants completed the intervention over a 7-